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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/944,317	08/31/2001	Nikos Paragios	2000P07873US01	2148

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Siemens Corporation  
Intellectual Property Department  
186 Wood Avenue South  
Iselin, NJ 08830

EXAMINER
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LAVIN, CHRISTOPHER L

ART UNIT	PAPER NUMBER
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2621

DATE MAILED: 04/04/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/944,317

Applicant(s)

PARAGIOS ET AL.

Examiner

Christopher L Lavin

Art Unit

2621

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 09 December 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-14 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 31 August 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)             | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. _____  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                                    |

## DETAILED ACTION

### *Response to Amendment*

1. Applicant's arguments, see pages 2 - 4, filed 12/09/04, with respect to the rejection(s) of claim(s) 1 and 8 under 103(a) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Karmann (5,034,986) as modified by Abbot.

### *Claim Rejections - 35 USC § 103*

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

4. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation

under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5. Claims 1, 3, 4, 7, 8, 10, 11, and 14 rejected under 35 U.S.C. 103(a) as being unpatentable over Karmann (5,034,986) in view of Abbot (5,999,634).

In regards to claim 1 Karmann discloses A method of video analysis comprising the steps of: estimating a background reference frame, i.e., dynamic background memory, for representing a background (col. 5, lines 22 – 51); [estimating geometric parameters for representing a scale variation of objects in a given frame]; obtaining a change detection map, i.e., binary object mask, for distinguishing the background from the objects in the given frame (col. 6, lines 23 – 55); and [combining the change detection map with the geometric parameters to determine a measure of congestion of the given frame].

As shown above Karmann teaches A method of video analysis where a background reference frame is estimated and a change detection map is obtained. However Karmann does not teach of estimating geometric parameters or combining the change detection map with the geometric parameters.

However, Abbot teaches (Figure 1; col. 1 lines 17 – 30) estimating geometric parameters for representing a scale variation. The image captured by Abbot is divided into tiles representative of spatial area (col. 8, lines 7 – 10) these tiles are of differing number of pixels due to the perspective correction (geometric parameter).

Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to estimate geometric parameters (as taught by Abbot) in the method disclosed by Karmann. It would then have been obvious to combine the geometric parameters with the activity map (disclosed by Karmann) as shown by Abbot (Figure 5). By scaling the activity map Karmann could more accurately track objects moving away from or towards the camera, instead of objects that simply move parallel to the camera.

In regards to claim 3, The method of claim 1, wherein said scale variation comprises variation in the object's width and height as a function of said object's position in the given frame, i.e., perspective (Abbott: col. lines 17 – 30: The scaling is based on the perspective of the camera).

In regards to claim 4, The method of claim 1, further comprising the step of updating the background reference frame using the change detection map (Karmann: col. 6, lines 56 – 60: The background reference frame is modified based on the background image which is calculated from the object mask, i.e., the change detection map.).

In regards to claim 7, The method of claim 4, wherein static pixels of the background reference frame are updated (Karmann: col. 5, lines 22 – 51: Every pixel of the background is updated, which includes the static pixels).

In regards to claims 8, 10, 11, and 14, claims 8, 10, 11, and 14 are rejected for the same reasons as claims 1, 3, 4, and 7 (respectively). The argument analogous to that presented above for claims 1, 3, 4, and 7 is applicable to claims 8, 10, 11, and 14.

6. Claims 2, 6, 9, and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Karmann as modified by Abbot as applied to claim 1 above, and further in view of Ostendorf et al ("HMM topology design using maximum likelihood successive state splitting," Computer Speech & Language, vol. 11, no 1, pp. 17 – 41, 1997).

In regards to claim 2, Karmann (as modified by Abbot) has everything in common with claim 2 except for using Hidden Markov Model with successive state splitting, which is what is claimed in claim 2.

Ostendorf in the first full paragraph on page 19 discloses the use of a Hidden Markov Model (HMM) with Successive State Splitting (SSS) which starts with a single node or state uses likelihood to determine confidence limits and where appropriate split the node into two, creating a new state.

Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to use HMM with SSS as taught by Ostendorf to estimate the background frame of Karmann (as modified by Abbot). Markov models are among the best understood and best performing statistical tools for time-series inference, HMM are ideal for dealing with continuous data. As Karmann is intended to track objects in outdoor environments there are several background situations that should be taken into account: night, day, cloudy, sunny, etc.; using HMM with SSS to create a background reference frame would be highly advantageous.

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In regards to claim 6, The method of claim 2, wherein each of said multiple nodes is assigned to a new state (Ostendorf: First full paragraph on page 19: A new state is created for each split off node.).

In regards to claims 9 and 13, claims 9 and 13 are rejected for the same reasons as claims 2 and 6 (respectively). The argument analogous to that presented above for claims 2 and 6 is applicable to claims 9 and 13.

7. Claims 5 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Karmann as modified by Abbot as applied to claim 1 above, and further in view of Higashikubo (5,999,635).

In regards to claim 5, Karmann (as modified by Abbot) discloses the method of claim 1; however, Karmann does not disclose measuring congestion.

Higashikubo discloses in the paragraph starting at column 3, line 37 taking the ratio of the congestion area to the overall area to determine the percent of congestion at a given time. Higashikubo is a method for tracking movement.

Therefore it would have been obvious to one having ordinary skill in at the art at the time of the invention to include a congestion measurement (as taught by Higashikubo) to the tracking method disclosed by Karmann (as modified by Abbot). Calculating the congestion of an image could allow Karmann to better determine how many objects are being tracked and better anticipate objects occluding each other.

In regards to claim 12, claim 12 is rejected for the same reasons as claim 5. The argument analogous to that presented above for claim 5 is applicable to claim 12.

**Conclusion**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christopher L Lavin whose telephone number is 703-306-4220. The examiner can normally be reached on M - F (8:30 - 5:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bhavesh M. Mehta can be reached on (703) 308-5246. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

CLL



**BRIAN WERNER**  
**PRIMARY EXAMINER**